T-RCED-89-11

GA1.5/2:T-RCED-89-11

United States General Accounting Office

GAO Testimony

For Release
on Delivery
Expected at
9:30 a.m.
Thursday
February 23,
1989

Enormous Modernization and Cleanup Problems in the Nuclear Weapons Complex

Statement of Charles A. Bowsher
Comptroller General of the United States

Before the
Subcommittee on Transportation and
Hazardous Materials
Committee on Energy and Commerce
House of Representatives

GA 1.5/2:

Mr. Chairman and Members of the Subcommittee:

We are pleased to provide our views on what is needed to clean up and modernize the Department of Energy's (DOE) nuclear weapons complex. My testimony is based on a large body of work--over 50 reports and testimonies since 1981--that we have completed on the environmental, safety, and health aspects of DOE's nuclear weapons complex. Cleaning up and modernizing the complex will be a formidable task which is estimated to cost up to $155 billion. Let me stress that while cost estimates are not budget quality, they do serve to illustrate the magnitude of the problems within the complex. As more information is gathered, indications are that the final cost could be higher.

In previous congressional testimony, I have used the problems in DOE's nuclear weapons complex as an example of how we have not invested wisely in key government operations. We have consistently made short-term decisions which now leave us with extremely serious problems that will require long-term solutions with enormous costs. DOE's own studies agree that production of nuclear material has been emphasized to the detriment of safety and environmental concerns. They also point out that capital investment to maintain many key components in the complex has averaged less than 2 percent, in contrast to a 4- to 7-percent level normally associated with industrial facilities.

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The problems at DOE's complex are so serious that they have at least temporarily shut down key facilities that affect the nation's ability to produce nuclear material for weapons. Dealing effectively with these problems represents one of the major areas of explosive unfunded costs that will have to be dealt with at the same time we address the budget deficit. A comprehensive and well-planned approach to address the problems is overdue, and further delays will only worsen the situation.

In the last session of the Congress, the debate was over whether major problems existed in DOE's nuclear weapons complex. The debate in this session can move from the recognition and acceptance that there are serious problems in the nuclear weapons complex to how to fund and deal with them. The role of this Congress and administration will be to strike a balance between maintaining our national security and protecting the public and the environment, as well as establishing the pace at which the nation moves its weapons complex into the twenty-first century.

The remainder of my testimony provides perspective on (1) the scope and direction of DOE's modernization and cleanup plans, (2) the reasonableness of the cost estimates to implement these plans, (3) the structure needed to most effectively and efficiently resolve the problems, (4) our views on DOE's fiscal year 1990

budget, and (5) comments on H.R. 765.[1] Before getting into the specifics, I would like to begin with an overview of the complex and its problems.

THE NUCLEAR WEAPONS COMPLEX AND ITS PROBLEMS

Since World War II, nuclear weapons have played a dominant role in the nation's defense strategy. DOE oversees production of weapons at 16 major installations located around the country (see attachment I). The complex's basic mission is to produce nuclear material (e.g., plutonium and tritium) for weapons and naval fuel.

DOE funding requirements for nuclear defense activities in each of the last 3 years have been about $8 billion. In total, the complex represents a public investment of about $100 billion. It includes a wide variety of plants with interrelated purposes, such as nuclear reactors, specialized laboratories, uniquely designed plants for fabricating nuclear material, and nuclear waste facilities.

DOE's nuclear weapons complex, considered in its entirety, is one of the more potentially dangerous industrial operations in the

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[1]H.R. 765 was introduced on February 2, 1989, and would establish a commission to make recommendations to the President and Congress to ensure a comprehensive national approach to effective, efficient, and expeditious cleanup of environmental contamination at DOE facilities

world. The operations routinely use and generate large quantities of a wide range of hazardous and radioactive materials. These materials must be handled, transported, and disposed of carefully by workers not only to prevent exposure to themselves but also to prevent these materials from being released into the environment. Because of lethal levels of radiation and high-level heat generation, many of the materials must be handled with special shielded equipment to prevent worker exposure.

DOE operations also involve controlling nuclear reactions and handling highly fissionable nuclear material. The unfortunate Chernobyl accident demonstrates the more dangerous aspects of controlling nuclear reactions and nuclear material. Finally, DOE operations must be protected against the more commonplace industrial dangers, such as fires or other processing accidents.

GAO's work over the past several years has described a variety of unresolved safety, environmental, and operational problems. Specifically, we have called attention to the following:

-- Serious safety questions regarding the operation of government production reactors at Savannah River, South Carolina, including the adequacy of the emergency cooling systems and the need for ultrasonic testing to examine the reactor tanks for the possibility of cracks.

-- The problems at DOE's facilities that result from aging and inattention to capital improvements. For example, some buildings and equipment have deteriorated to the point where they now have safety and operational problems. Furthermore, some equipment and/or processes used within the complex are obsolete, making repair work difficult and spare parts virtually impossible to procure.

-- Over 3,000 inactive waste sites at DOE facilities--the result of past hazardous and radioactive waste disposal practices--that will require action.

-- Groundwater and soil contamination at DOE installations around the country, some at levels hundreds to thousands of times above standards. At some locations, such as the Y-12 Plant in Tennessee, environmental contamination has spread off-site.

In March 1987, we pointed out that DOE did not have an adequate plan for addressing the wide-ranging problems it faces and assuring the Congress that it could meet the nation's need for nuclear material for weapons. We called on DOE to develop a strategic plan setting forth (1) the projected facility requirements for an updated nuclear weapons complex; (2) a comprehensive picture of the environmental, safety, and health issues that had to be addressed; and (3) a framework for

prioritizing the billions of dollars in federal expenditures needed to remodel or build new facilities, as well as to clean up environmental contamination.

In December 1987, the Congress mandated that the President prepare such a plan to modernize the nuclear weapons complex.[2] DOE delivered that plan to the Congress early this January.[3] While DOE was preparing the plan, more safety and health problems surfaced within the nuclear weapons complex. These problems have resulted in the unanticipated shutdown of key nuclear operations. At present, DOE's reactors at Savannah River, South Carolina, and Hanford, Washington, are shut down. Also, a key plutonium processing building at the Rocky Flats Plant in Colorado was recently shut down for almost 4 months for safety reasons.

Correcting the problems that have been enumerated over the last several years will be difficult. According to the plan DOE recently issued, the entire complex will require extensive modernization over the next 20 years and beyond. The report also states that the costs for environmental restoration will be significant during this modernization period. Specifically, the plan calls for additional spending of $81 billion--$52 billion for

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[2]National Defense Authorization Act for Fiscal Years 1988/1989 (P.L. 100-180, Dec. 4, 1987).

[3]United States Department of Energy Nuclear Weapons Complex Modernization Report (Report to the Congress by the President, Dec. 1988).

modernization and $29 billion for environmental restoration. The plan is an important document because it outlines DOE's current thinking regarding the pace and direction of modernizing and cleaning up the complex.

DOE FOCUSES ON MODERNIZATION

DOE must deal with modernizing its aging complex because of past mistakes--overemphasis on production, negligence in the environmental area, and complacency with regard to safety. While the modernization plan lays out DOE's view of what facilities will be needed in the year 2010 to meet production needs, it does not clearly define what environmental cleanup problems will be resolved during the same time frame.

By 2010, if the plan is followed, DOE will have upgraded many of its plants and constructed two new production reactors and a special isotope separation facility. It will have largely relocated and/or phased out other installations, such as the Rocky Flats Plant in Colorado and Fernald in Ohio. Modernization activities would essentially be completed by 2010, and the nation would have a revitalized weapons complex. However, problems in the environmental area would still be with us. In our opinion, the plan does not adequately address the cleanup of existing facilities and decontamination of facilities as they are retired from service. The plan provides little perspective on how these important problem

areas will be solved or what needs to be done in these areas between now and 2010.

While the plan does provide DOE's views on the future configuration of the complex, it is just a first step that raises a series of issues that the Congress will need to consider. For example:

-- Should both planned new production reactors be given top priority? DOE's plan calls for two new reactors. Reactors will be built at different sites, and one will use a new technology.

-- Does DOE have the capability to meet nuclear material needs while the new reactors are being built? Currently, all of DOE's production reactors are shut down. It is unclear to what extent the reactors can be relied upon in the future to produce nuclear material.

-- Should the special isotope separation facility be a priority activity? DOE's plan places high priority on this project, which is to be used to convert fuel-grade plutonium to weapons-grade plutonium. Given the other planned upgrades of plutonium facilities within the complex, questions regarding the emphasis placed on this facility need to be addressed.

-- Are DOE's plans to upgrade facilities that it plans to later phase out appropriate? DOE's plan calls for a number of upgrades at facilities it plans to shut down within several years. The trade-offs between upgrades and eventual shutdown need to be carefully studied.

DOE's plan places modernization on a faster track than environmental cleanup and decontamination. DOE is still studying the extent of contamination at its facilities. Therefore, it has not made key decisions on the extent of environmental cleanup or which sites get cleaned up first. Also, the Congress should consider the issues we have just raised, as well as others that may arise in deciding priorities and balancing modernization and cleanup needs. Accordingly, we believe the plan should be viewed only as a first step in establishing a national consensus to rebuild and clean up the complex. We are currently working with a number of congressional committees on many of these issues.

COST ESTIMATES VERY UNCERTAIN

Next, I want to briefly discuss the reasonableness of cost estimates set forth in DOE's modernization report. We have previously reported that the total cost of addressing the major

problem areas within the complex is estimated to be up to $155 billion.[4]

The modernization plan's calculation of costs differs from ours in methodology and scope. For example, the DOE modernization report highlights $81 billion for modernization and environmental restoration over the next 21 years. This $81 billion represents the additional funds (an increment) needed during the next 21 years over and beyond funding DOE programs each year at the fiscal year 1989 level of approximately $8 billion. Further, the $81 billion represents costs only through 2010. In the environmental restoration area, DOE recognized that total costs could range from $40 billion to $70 billion and would extend beyond 2010. (Attachment II provides a detailed comparison of DOE's modernization report and the GAO report.)

As I said earlier, it is important to note that all of these estimates are not budget quality and are designed only to approximate the funds needed. In the final analysis, the true cost may be far higher. For example, some of the planned facilities will use new technologies, such as the isotope separation facility and a hign-temperature, gas-cooled reactor. DOE's construction of such facilities has been prone to huge cost overruns. Further, many uncertainties exist with regard to how we can clean up

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[4]Dealing With Major Problem Areas in the Nuclear Defense Complex Expected to Cost Over $100 Billion (GAO/RCED-88-197BR, July 6, 1988).

existing environmental contamination and decontaminate large nuclear facilities. DOE's modernization plan does not shed much light on what cleanup procedures will be used. Finally, we are not sure that all the problems within the complex have surfaced. For example, in the environmental area, uncertainty still exists not only regarding the size of problems but also regarding the extent to which DOE sites can be cleaned up. Some locations may be irreversibly contaminated.

DOE'S STRUCTURE

The next key issue is whether DOE is properly structured to manage this massive rebuilding effort. This is important for ensuring that past mistakes are not repeated. Some changes in DOE's current structure may be warranted to acquire the necessary technical expertise, provide strong safety oversight, and establish needed policies and procedures as a basis for managing the modernization effort.

In regard to technical expertise, in 1981, a DOE task force looking at the Three Mile Island accident criticized DOE for not having sufficient technical resources to manage its nuclear facilities. This criticism was repeated in the October 1987 National Academy of Sciences report on DOE's production reactors. Sufficient technical resources are needed to undertake the modernization effort--upgrading existing facilities and building

new ones. In addition, DOE must continue to hire quality technical people to manage and oversee ongoing operations. For example, the Office of the Assistant Secretary for Environment, Safety and Health must continue its program to place resident inspectors at DOE facilities. However, we still believe the question is open as to whether DOE has sufficient technical expertise to accomplish all the tasks ahead.

In addition, we have long supported the need for an independent organization outside the control of DOE for overseeing the agency's internal safety program. Public Law 100-456 created such an entity--the Defense Nuclear Facilities Safety Board--but we are concerned that the law excludes certain weapons facilities from the Board's oversight, including Pantex in Texas and the Nevada Test Site.

Finally, all the necessary policies and standards are not currently in place to guide the modernization effort. For example, in our July 1988 report on the oversight of DOE's nuclear facilities, we recommended that DOE establish a meaningful safety policy, related standards, and implementation policies to guide continued operation of its facilities.[5] The policies and standards can also be used as baseline safety criteria for developing the future strategy for the weapons complex. A DOE safety policy has

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[5]Oversight at DOE's Nuclear Facilities Can Be Strengthened (GAO/RCED-88-137, July 8, 1988).

been in draft since May 1988. DOE believes it will be issued in a few months. The detailed implementing procedures are expected to be issued later. Once they are in place, DOE will apply them to existing facilities and to the design of new facilities. This probably will entail safety upgrades, which may increase the costs estimated in the 2010 modernization plan.

As the debate continues, other questions concerning DOE's structure will be raised. For example: (1) Is DOE's current organizational structure for managing its nuclear weapons complex appropriate? (2) Should safety upgrades be separated from operational funds in the budget, as DOE has separated environmental cleanup, so that the level of funding for safety and specific safety-related projects can be separately tracked?

DOE'S FISCAL YEAR 1990 BUDGET

Next, I would like to briefly discuss DOE's fiscal year 1990 budget request for the complex. The new administration recently amended this request by providing an additional $360 million for environmental, safety, and health activities, so I will be referring to the amended dollar amounts here today. Currently, of the $9.4 billion requested for the complex, approximately $3.7 billion is earmarked for addressing the problems of the complex.

According to DOE, this level of support represents the first step toward modernization and cleanup of the nuclear defense complex.

The $3.7 billion for addressing major problem areas within the complex represents a $1.1 billion, or 42 percent, increase in funding over fiscal year 1989 levels. More specifically, funding for modernization activities have been increased by $471 million to $1.3 billion, which allows for further development of new production reactors and the special isotope separation facility. Funding for environmental compliance and safety and health activities has been increased by $383 million to almost $1.4 billion, and funding for environmental cleanup was increased by $242 million to $401 million. In the fiscal year 1990 budget request, radioactive waste management funding was decreased by $21 million to $575 million. While DOE is requesting increased funding for many problem areas, it is important to note that, given the magnitude of the problems and the enormity of the costs to correct them, the funds represent only a small downpayment on resolving the problems of the complex. This is particularly true in the environmental cleanup area, where DOE plans to spend $401 million on a problem estimated to cost from $40 billion to $70 billion.

Because of the magnitude of problems facing DOE, and the limited resources available in a deficit era, the budget request will be

closely scrutinized. In our view, there are a number of key questions that need to be addressed:

-- Are DOE's priorities among various modernization and environmental cleanup activities appropriate? Earlier in my testimony, I raised a number of important issues associated with the modernization plan, such as whether both new production reactors should be given a top priority. These issues must be weighed in the budget process against other needs, including safety upgrades of existing facilities and environmental cleanup. Finding the proper balance between these important areas will be difficult.

-- Is DOE's funding for environmental cleanup sufficient? In view of the magnitude of the environmental problems facing DOE, its fiscal year 1990 budget request is small. Possible increases in funding will likely be discussed in the budget process. We believe any discussion should include consideration of DOE's ability to effectively spend additional environmental cleanup funds in fiscal year 1990.

In order to solve the problems of the complex, DOE must gear up to effectively spend billions of dollars each year not only on modernization, but also on environmental cleanup. Assuring that

these funds are effectively spent will be as difficult as finding the funds themselves.

COMMENTS ON H.R. 765

Finally, Mr. Chairman, I would like to comment on how we believe the national commission proposed by Representative Dingell and a bipartisan group of 25 Members of Congress in H.R. 765 could play an important role in helping to ensure that a comprehensive approach exists to cleaning up hazardous and radioactive contamination at DOE's nuclear facilities.

The proposed commission would be tasked with making a number of recommendations to the President and the Congress, including determining the adequacy of the existing data on environmental contamination, reviewing DOE's existing organization and management structure, and assessing technological capabilities to clean up various types of contamination. As proposed, it would also recommend a process for setting national priorities for environmental remediation activities at DOE's nuclear facilities as well as identify methods to fund those activities.

The proposed commission could assist DOE in its long-range planning efforts by assessing actions needed to further investigate the scope of the environmental problems and making recommendations concerning an appropriate process for setting

priorities. DOE is still studying the extent of its environmental problems and needs to develop a long-range strategy to focus and prioritize its cleanup efforts. In September 1986, we recommended such an environmental strategy, and in March 1987, recognizing a broad need, we recommended an overall weapons complex strategy. Recent DOE reports defined the magnitude of the environmental problems and established preliminary ranking of these problems. However, none of the reports--individually or when taken together--provide an overall strategy for cleaning up DOE's nuclear facilities. Therefore, the long-range strategy that we recommended to resolve environmental problems is not yet available.

Aside from assisting DOE in its planning, the commission will be focusing on several specific problem areas that need to be addressed. For example, DOE must have a program in place to effectively and efficiently manage its cleanup activities. This is important because as cleanup standards are established and agreements are reached on the level of cleanup, expenditures will increase to reflect actual cleanup activities. I have already raised a number of questions related to DOE's ability to manage this effort, such as technical expertise. In addition, DOE must develop technologies and/or techniques to clean up some problems--such as high-level radioactive contamination in the soil and some radioactive material in the groundwater--an issue the commission will be addressing. Moreover, our work and the work of others have shown that establishing effective environmental cleanup programs is

a difficult undertaking. Commission members from the Environmental Protection Agency, state governments, and environmental groups could provide guidance on establishing a cleanup program based on their experience.

Overall, we believe the national commission is being proposed at a most opportune time. As you know, Mr. Chairman, congressional interest is high, and there are many views about the problems DOE is facing and how to deal with them. Information and recommendations developed by the commission could help to clarify issues and form the basis for a national consensus in developing a comprehensive approach to cleaning up DOE's facilities.

SUMMARY

In summary, the ramifications of the deterioration of our nuclear weapons complex are enormous and raise serious budgetary, national security, and environmental issues.

-- From a budgetary perspective, estimates to revitalize the complex range as high as $155 billion over the next 20 to 30 years. The budget proposal before you is only a very small downpayment on this enormous bill, and the administration has not provided a funding plan that would show how and when the costs would escalate.

-- From a national security perspective, our ability to produce critical nuclear material for weapons is virtually nonexistent at this time. If problems affecting reactor operations are not addressed soon, the country's ability to produce and maintain a nuclear weapons arsenal will be in serious jeopardy.

-- From an environmental perspective, inattention and negligence in complying with environmental laws have contributed to widespread contamination at DOE installations. More ominously, the environmental contamination has spread off-site at some facilities where it could potentially affect the public in surrounding communities. Moreover, some sites may be irreversibly contaminated, and DOE may have to place them in long-term institutional care.

The 2010 modernization plan brings DOE and the Congress to an important crossroad--that of making critical decisions about the balance between restructuring an aging weapons complex to provide new and expanded production capability; ensuring that new and existing facilities meet environmental, safety, and health laws and regulations; and cleaning up the result of years of environmental contamination. The Congress must make these decisions within the framework of the conflicting demands for limited resources necessitated by the budget deficit, while recognizing that the

nuclear material from the complex is critical to our national defense.

The 2010 modernization plan is a first step in framing the debate. Today, we have a better understanding of the problems facing the complex. However, DOE is continuing to develop information on the extent of the problems and to address and prioritize what needs to be done to correct them. While all the problems are not yet completely understood, the national debate can now begin to find solutions. Because of the enormous costs associated with the solutions, the Congress will be making decisions about the complex for many years.

DOE can assist the Congress in its deliberations in future years by periodically updating the 2010 modernization plan. Such updates would keep the Congress and the public informed on the overall direction, priorities, and progress DOE is making as the modernization effort continues. In this regard, DOE should develop a spending plan to help ensure effective use of expected large increases in funding. Incorporating information on anticipated funding needs over several years in future updates of the plan will provide this committee and others the kind of information needed to understand the balance between modernization and environmental cleanup actions. This would also ensure that annual budget decisions remain consistent with the long-term objectives for the complex. In addition, the commission proposed in H.R. 765 could

help to clarify issues and form the basis for a national consensus in developing a comprehensive approach to cleaning up DOE's facilities.

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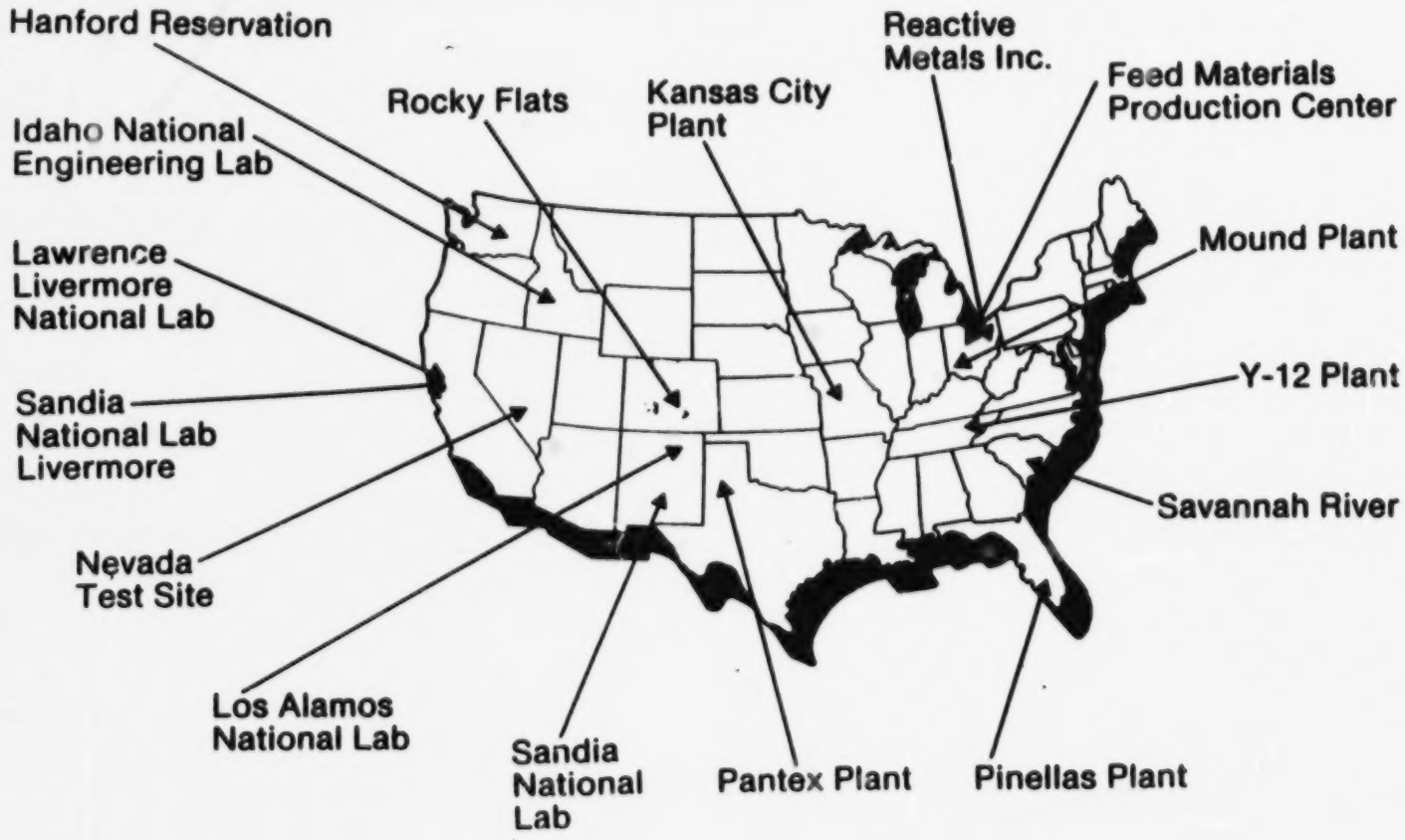
Thank you, that concludes my testimony. We would be happy to answer any questions.

GAO Major Sites Within the Nuclear Defense Complex



ATTACHMENT I

ATTACHMENT I

ATTACHMENT II

COMPARISON OF GAO'S REPORT WITH DOE 2010 MODERNIZATION REPORT

	Estimate in: GAO July report (billions)	Estimate in: DOE 2010 report[a] (billions)	Explanation of major differences
DEFENSE COMPLEX			
Upgrading existing capabilities plus modernization	$ 35-45	$44.7	GAO has not had the opportunity to review the supporting documentation to 2010 study.
Disposal of radioactive waste	$ 30	$ 7.5	DOE's estimate reflects the incremental cost. It does not include costs beyond 2010.
Decontamination	$ 15	$ 4.7	DOE's estimate reflects the incremental cost. Further, it does not include active facilities and does not include costs beyond 2010.
Environmental restoration	$ 35-65	$24.1	DOE's estimate does not include all environmental restoration costs nor costs beyond 2010.
Total	$115-155	$81.0	

[a]Incremental costs represent the additional funds needed during the next 21 years over and beyond funding DOE programs each year at the fiscal year 1989 level.

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